Larger Polities Are More Regulated

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Abstract

Using a variety of novel data sources from the RegData project, we show that population levels and the amount of regulation are highly correlated across countries and time, and that more-populated US states, Australian states, and Canadian provinces tend to be more heavily regulated than less-populated states and provinces. A doubling of population size is associated with a 22 to 33 percent increase in regulation. This provides support for the theory that the fixed costs associated with regulating partly determine where and when regulations occur.

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Mulligan and Shleifer (2005) put forward a theory of regulation in which a fixed cost of regulating leads larger polities to regulate more. This follows a prediction made in Demsetz (1967) that because institutions have fixed costs associated with their establishment, introducing an institution only becomes efficient once the scale of the activity it supports is significant enough to cover the costs of creating it. Since administrative regulatory agencies are one form of institution, this prediction leads to a testable hypothesis that regulatory volume will scale as a function of population. Stated slightly more formally, the hypothesis is that, ceteris paribus, more populous jurisdictions should have more regulation. Jurisdictions with larger populations should create more regulation because they can spread the fixed costs of establishing regulatory institutions over a larger market.

Mulligan and Shleifer (2005) test this model across 37 US states, evaluating whether states with larger populations in fact have more regulations than states with smaller populations.[1] The authors measure regulation using the computer-file size of each state's laws (measured in bytes, thereby approximating word count), and find the data to be consistent with their prediction. A doubling of population was associated with a statistically significant 31 percent increase in regulatory file size, after controlling for a number of other variables that could plausibly influence regulation, some of which—such as income per capita—showed no statistically significant effect.

[1] "The theory predicts that, other things equal, more populous communities should regulate more activities, and do so more intensively. This yields a novel prediction that population is a determinant of the quantity of regulations" (Mulligan and Shleifer 2005: 1447).

More recently, Djankov et al. (forthcoming) examine title and transfer of title regulations in cities across the world. The authors develop a model of urban commuting decisions in which rent levels and worker location decisions depend on the strength of property rights in a jurisdiction. Their analysis shows that regulation is more cumbersome in cities with higher urban population density, but also that property rights appear to be strengthening over time, which is consistent with Demsetz's (1967) observation that property rights should become better defined as transaction costs fall.

Beyond studies such as these, however, very few academic studies have advanced scholars' understanding of the relationship between regulation and population. This article is intended to help fill this gap in the literature. We aim to test whether this population-regulation connection holds using more recent, more refined, and more comprehensive measures of regulation.

The data this study relies on come from the RegData project, originally introduced in Al-Ubaydli and McLaughlin (2017). The RegData project has developed AI and machine learning approaches to analyze the text of policy documents such as laws and regulations—most notably, the enormous text of the *Code of Federal Regulations*. The resulting datasets quantify how the amount of regulatory restrictions has evolved over time, and how many of these restrictions apply to specific industries. The RegData project has used similar techniques to summarize federal regulations in Canada and Australia, as well as state- and province-level regulations in the United States, Canada, and Australia.

RegData datasets (henceforth, RegData) have been used extensively to study the effects of regulation on various aspects of economic performance, such as employment growth and firm size (Bailey and Thomas 2017; Chambers, McLaughlin, and Richards 2018), wages and income

inequality (Bailey, Thomas, and Anderson 2019; Chambers, McLaughlin, and Stanley 2019), GDP growth (Coffey, McLaughlin, and Peretto forthcoming), and prices (Chambers, Collins, and Krause 2019). But while a large and growing literature has used RegData as an independent, explanatory variable, it has rarely been used as a dependent variable to understand where regulations come from as opposed to what they do once enacted.[2] This study is the first to use RegData to measure why some polities are more regulated than others, the first to use the full State RegData (released in October 2019) for any econometric analysis, and the first to combine federal and state RegData for the United States with RegData datasets for other countries (Australia and Canada).

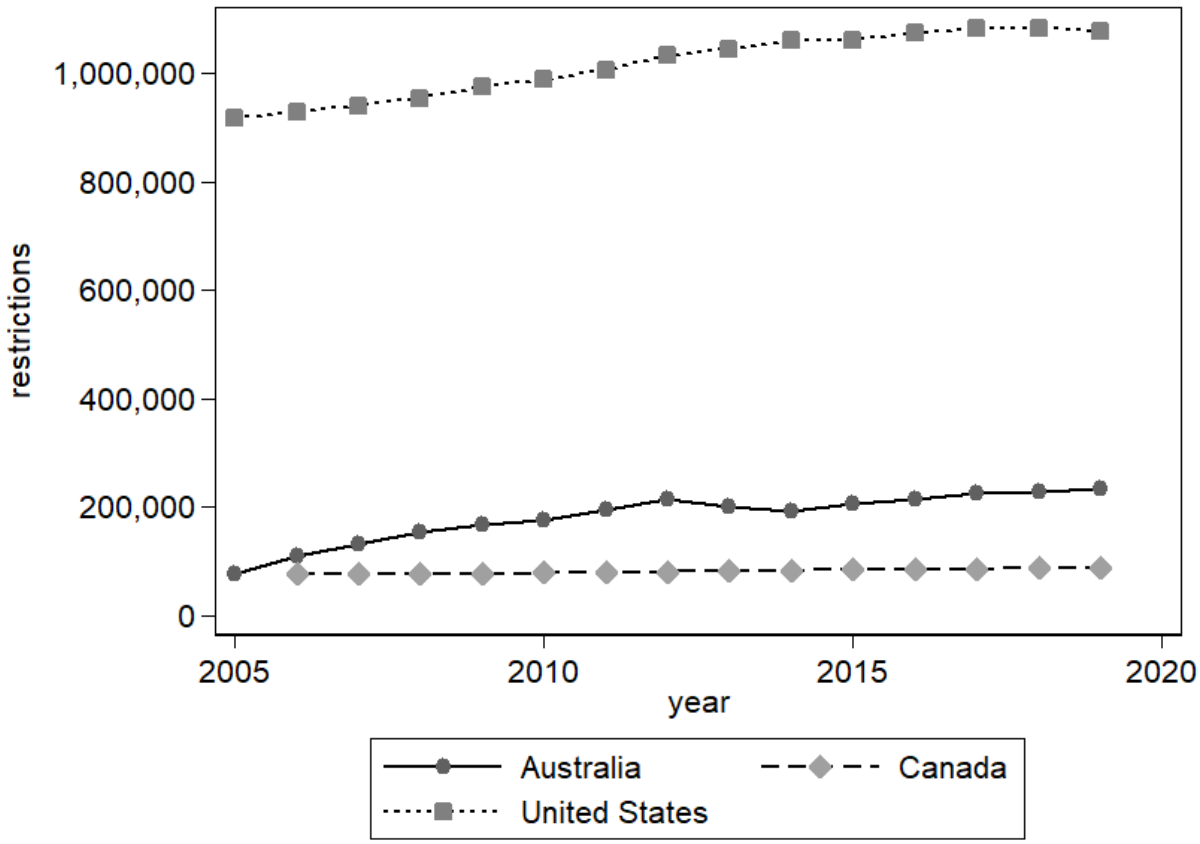
Data and Results

Are the Australian, Canadian, and US population sizes consistently correlated with their regulatory volumes? And do the restrictions-per-capita ratios stay relatively constant over time? Figures 1 and 2 illustrate the Australian, Canadian, and US regulatory regimes as measured in regulatory restrictions, the metric of regulatory volume established and made available by the RegData project. Figure 1 shows absolute measures of regulatory restrictions (i.e., measures uncorrected for population). The US measures are almost an order of magnitude higher than those of Canada and about five times as large as Australia's. All three data series are upward-trending over time.[3] This evidence is consistent with Mulligan and Shleifer's (2005) findings,

[2] The one exception to this that we are aware of is McLaughlin, Smith, and Sobel (2019).
[3] It is worth noting that the United States has a presidential system of government, while Australia and Canada have parliamentary systems. This may explain why the United States, which tends to centralize considerable power in the executive branch at federal and state levels, has more executive-branch regulations. Meanwhile, parliamentary systems combine legislative and executive functions in the parliament. The interested reader should consult McLaughlin, Sherouse, and Potts (2019) and Allen et al. (forthcoming) for more on the Australian data, and McLaughlin et al. (2018) for more on the Canadian data.

because the United States has a much larger population than the other two countries and it also has a roughly proportionally larger regulatory volume.[4]

Figure 1. Total US, Canadian, and Australian Federal Regulatory Restrictions (Absolute)



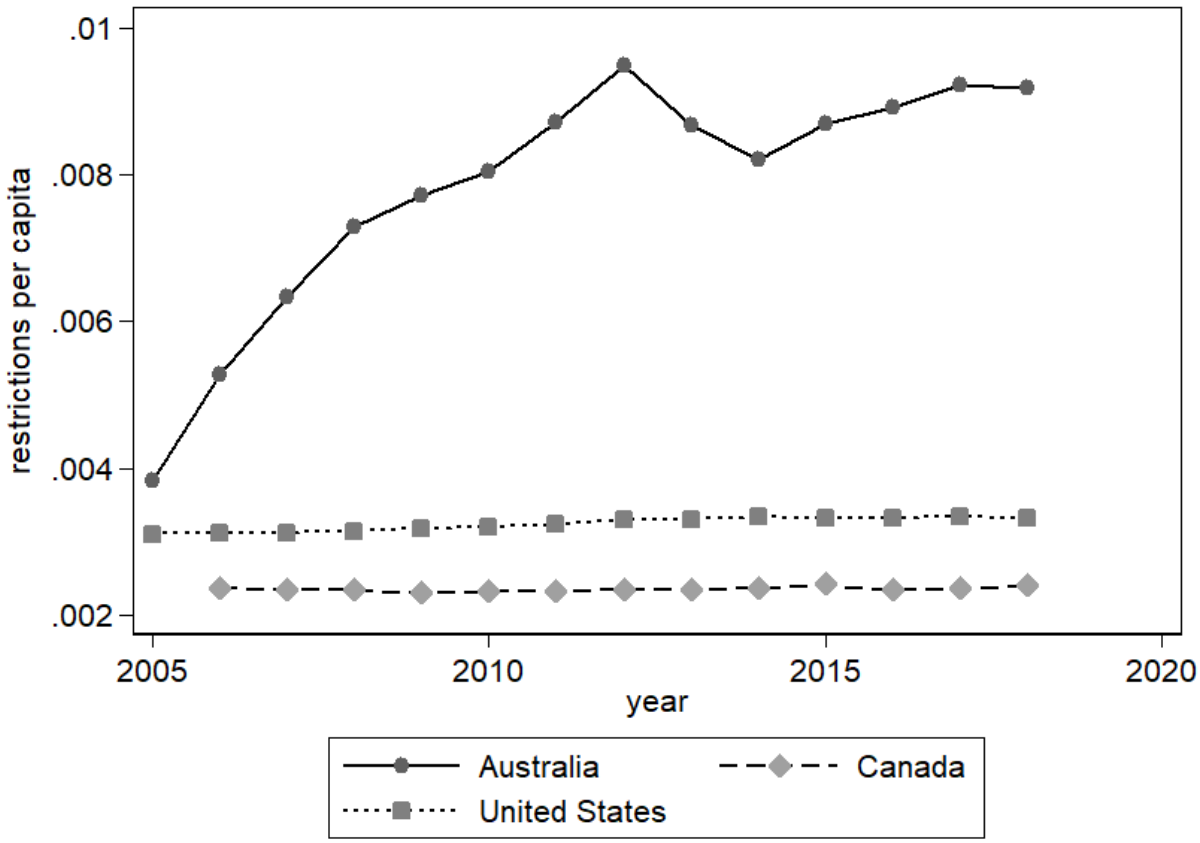
Source: Produced by the authors using the RegData Australia 2.0, RegData Canada 2.0, and RegData US Federal 3.2 datasets, available at QuantGov, accessed August 2020, https://quantgov.org.

The per capita numbers in figure 2 tell a somewhat different story. The number of restrictions per capita appears to be fairly constant over time for Canada and the United States,

[4] The United States also has a much older legislative body: Congress was founded in the 18th century, whereas the Parliament in Australia dates from 1901. However, Mulligan and Shleifer (2005) found that the age of US states was not a statistically significant predictor of modern regulatory levels, which suggests that the age of countries may not be an important factor.

whereas it varies substantially for Australia. We leave for further research the question of why the number of restrictions per capita differs across these three countries, as well as why it appears to be more variable in Australia.[5]

Figure 2. US, Canadian, and Australian Federal Regulatory Restrictions per Capita



Source: Produced by the authors using the RegData Australia 2.0, RegData Canada 2.0, and RegData US Federal 3.2 datasets, available at QuantGov, accessed August 2020, https://quantgov.org.

[5] We note for posterity two possible explanations for the differences in magnitude in restrictions per capita seen across these three countries. First, the appropriate measure of regulation, from the point of view of the economic agent, is probably the sum of all relevant regulation (i.e., national regulation and subnational regulation) in a jurisdiction. Subnational regulation may play a larger role in the Westminster systems adopted by Australia and Canada, which may devolve more power to the state or province level than does the presidential system of the United States. Second, parliaments may directly regulate via legislative instruments, rather than indirectly by delegating to agencies of the executive branch, comparatively more than legislatures in presidential systems. Each of these explanations would be testable with more complete data, but the measurement of statutes and of subnational regulations is not yet complete enough to do so here.

These preliminary results, both comparatively and through time, are somewhat consistent with Mulligan and Shleifer's (2005) hypothesis about population and the supply of regulation. The theory holds when comparing federal regulation in the United States to federal regulation in Canada. The United States has about an order of magnitude more people than Canada, along with about an order of magnitude more regulatory restrictions than Canada. Conversely, Australia is less populous than Canada but has nearly twice as many regulatory restrictions. On a per capita basis, Canada, with only 0.0023 restrictions per capita for the entire time period examined, appears somewhat less regulated than the United States (at about 0.0032 restrictions per capita) and significantly less regulated than Australia (whose restrictions per capita rise from about 0.0053 in 2005 to a peak of 0.0095 in 2012, and taper slightly to 0.0092 in 2018).[6] We note, however, that both the Canadian and the Australian regulatory systems are fairly decentralized compared to that of the United States, delegating a considerable amount of autonomy and authority to provincial governments. Therefore, we next turn to subnational polities that can provide more data and context.

US States

The Mulligan-Shleifer hypothesis can be explored further by including regulatory data from the various US states. Mulligan and Shleifer (2005) measured regulation in 37 states using the computer-file size of each state's statutes. We use similar but more precise regulation measures now available from RegData, which provides counts of total words and total regulatory restrictions for 46 states and the District of Columbia. The State RegData project attempts to

[6] One possible explanation for this finding is that Canada may be more concerned with constraining the growth of regulation than Australia is. For example, the Canadian federal government imposed a regulatory cap at the national level in 2015. See the Red Tape Reduction Act of 2015, C21, https://openparliament.ca/votes/41-2/273/.

quantify the amount of regulation in the administrative codes of the US states using a method similar to that used by the original RegData project to quantify the amount of federal regulation (McLaughlin et al. 2018).

The RegData word count measure has a correlation of 0.83 with the Mulligan-Shleifer file size measure from the first few years after 2000, which was essentially a count of characters of text, while regulatory restrictions has a correlation of 0.89 with file size. Some of the difference across measures is likely explained by the fact that we look at the text of administrative codes, which is a more direct measure of regulatory activity than the text of statutes written by legislatures. The two RegData measures (words and restrictions) have a correlation coefficient of 0.94.

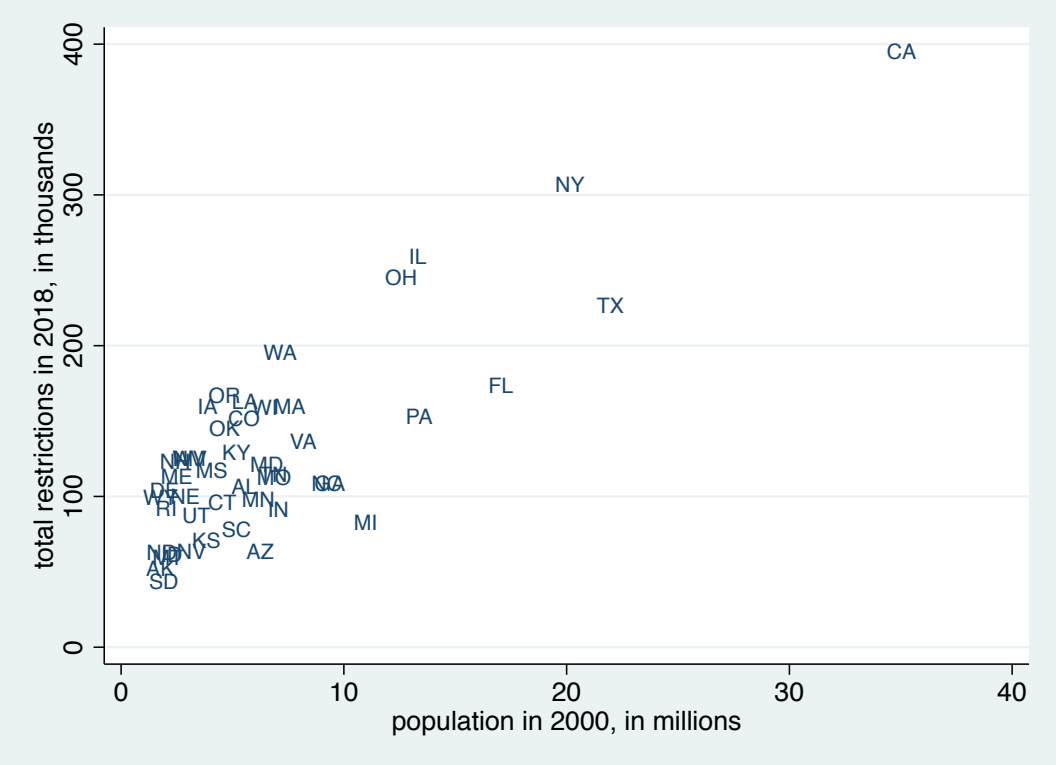
Figure 3 compares the 2000 population and 2018 regulatory restriction counts of 46 US states and the District of Columbia. We see a strong positive correlation between population and regulatory restrictions. Running a basic linear regression with no controls, we find that, on average, an increase in population of 1,000 people is associated with a statistically significant increase of 9 regulatory restrictions.

Since the distribution of both variables is fairly skewed to the right, we next take the log of both population and regulatory restrictions and run a simple linear regression on these variables. Table 1 presents the regression results, which show that, on average, a 10 percent increase in population is associated with a 3.27 percent increase in regulatory restrictions. This is almost identical to the elasticity of 0.31 found in the main specification of Mulligan and Shleifer (2005).

In the second and third columns of table 1, we add the controls used by Mulligan and Shleifer to the regression. These include a dummy for southern states, the log of lawyers per

capita, the log of land area, the log of income per capita, the log of the differential between the 90th and the 10th percentile of household income, occupational diversity (as measured by the fraction of workers in the largest 75 occupations), percentage urban, percentage white, the log of the number of state legislators, year of statehood (divided by 100), and the log of 1920 population. Using the largest set of controls in column 3 reduces the effect of population to marginal statistical significance, though perhaps merely by taxing the degrees of freedom in a small sample. None of the controls is even marginally significant, including income per capita and year of statehood, suggesting that population is the most important predictor of regulation.

Figure 3. Population and Regulatory Restrictions in US States



Note: This analysis includes 46 US states and the District of Columbia.
Sources: P.A. McLaughlin et al., State RegData (dataset), QuantGov (Mercatus Center at George Mason University, Arlington, VA, 2018); population data from C. Mulligan and A. Shleifer, "The Extent of the Market and the Supply of Regulation," *Quarterly Journal of Economics* 120 (2005): 1445–73.

Table 1. Population and Regulatory Restrictions in US States

Variable	(1) NoControls lnRestrictions	(2) SomeControls lnRestrictions	(3) AllControls lnRestrictions
lnp2000	0.327***	0.324***	0.218*
	(0.049)	(0.051)	(0.119)
south		−0.018	−0.017
		(0.108)	(0.161)
lnlawy90		0.093	−0.013
		(0.137)	(0.185)
lnarea			−0.062
			(0.080)
lnYpc2000			0.423
			(0.567)
ln9010			0.618
			(0.401)
whit2000			0.003
			(0.008)
lnseats			−0.099
			(0.170)
yr100			0.118
			(0.241)
lnp1920			0.112
			(0.097)
Constant	8.989***	9.169***	2.206
	(0.400)	(0.500)	(8.092)
Observations	46	46	46
R^2	0.509	0.515	0.579

Note: Standard errors are in parentheses.
* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Table 2 shows the results of two alternative specifications, where we take the "Some Controls" specification from Table 1 but use alternative measures of population. In the first specification, we use the log of total personal income in a state (lny2000), rather than the log of total population, to see whether it is the size of the economy rather than the population that matters; we find that its effect is significant and very similar in size to that of population. The second specification is a quadratic (rather than logged) measure of total population, using

population in millions (popM) and squared population in millions (popM2). We find that the effect of population is linear, with a population increase of one million leading to a statistically significant 7.6 percent increase in regulation, while population squared has no significant effect.

Table 2. Alternative Specifications for US States

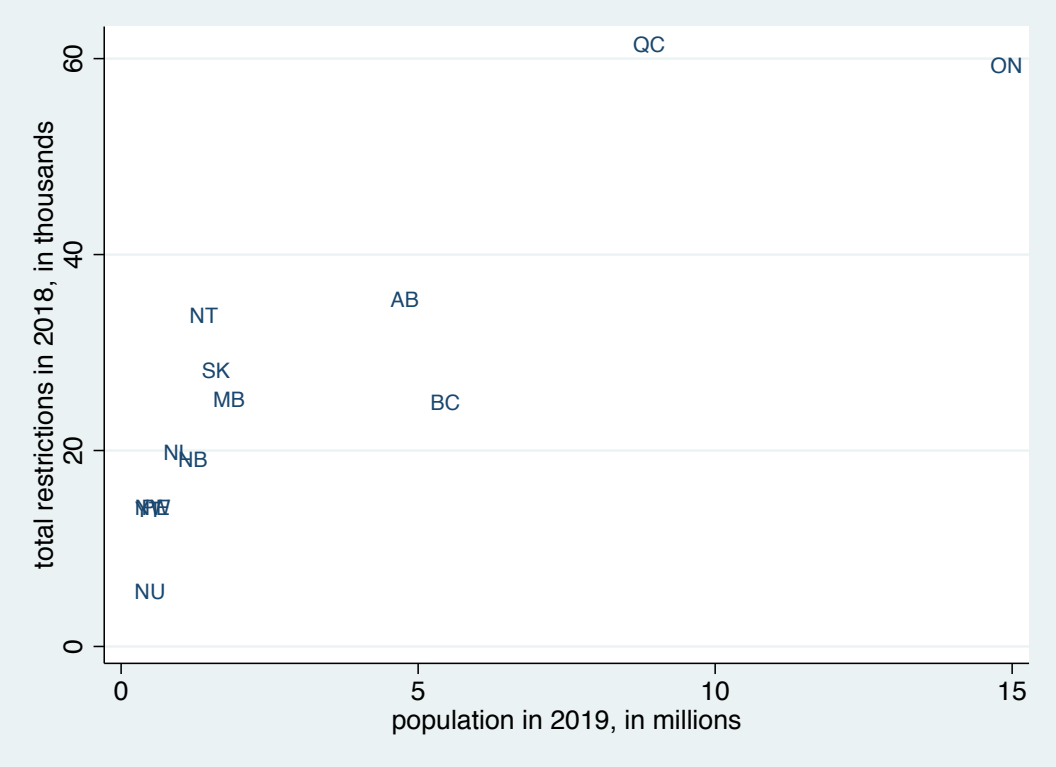
Variable	(1) Total Income lnRestrictions	(2) Quadratic lnRestrictions
lny2000	0.310***	
	(0.049)	
popM		0.076***
		(0.021)
popM2		−0.001
		(0.001)
south	0.013	0.039
	(0.107)	(0.108)
lnlawy90	0.036	0.027
	(0.139)	(0.138)
Constant	10.30***	11.33***
	(0.344)	(0.238)
Observations	46	46
R^2	0.519	0.537

Note: Standard errors are in parentheses.
* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Australian States and Canadian Provinces

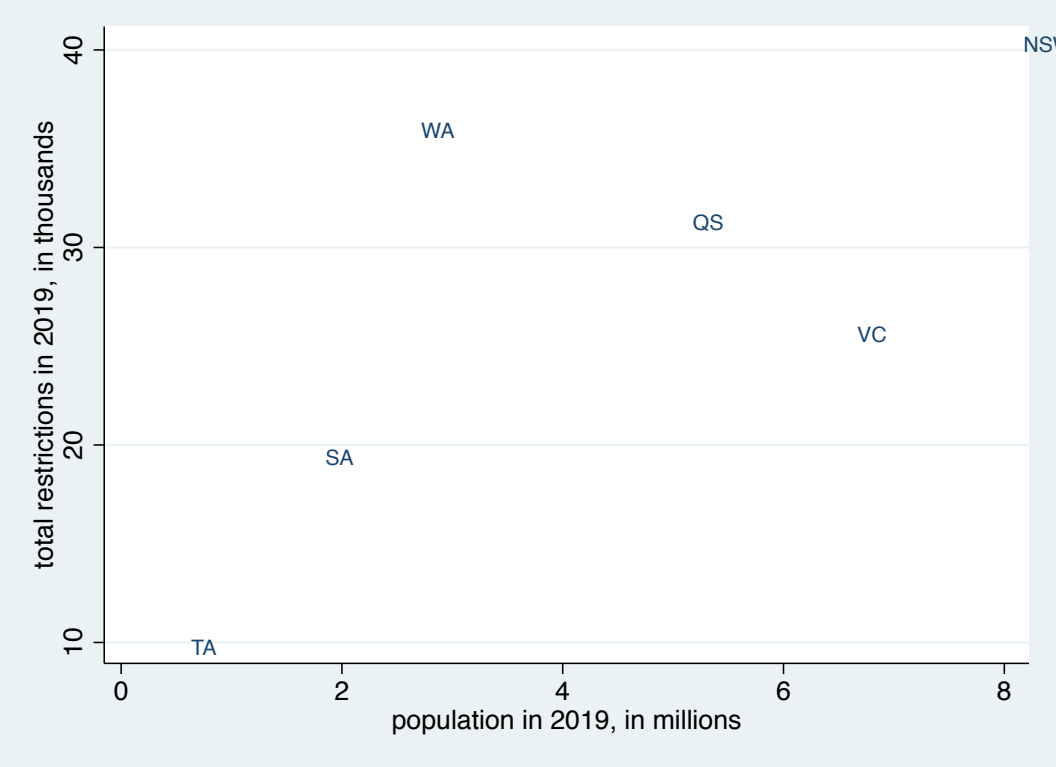
While Canada and Australia do not have enough provinces to support proper regression analysis, Figures 4 and 5 plot their subnational populations against their subnational regulatory restrictions. The results are also suggestive of a positive population-regulation correlation.

Figure 4. Population and Regulatory Restrictions in Canadian Provinces



Sources: P.A. McLaughlin et al., State RegData (dataset), QuantGov (Mercatus Center at George Mason University, Arlington, VA, 2018); population data from C. Mulligan and A. Shleifer, "The Extent of the Market and the Supply of Regulation," *Quarterly Journal of Economics* 120 (2005): 1445–73.

Figure 5. Population and Regulatory Restrictions in Australian States



Sources: P.A. McLaughlin et al., "RegData: Australia—Taking Inventory of Australian Regulations" (Mercatus Working Paper, Mercatus Center at George Mason University, Arlington, VA, 2019); population data from C. Mulligan and A. Shleifer, "The Extent of the Market and the Supply of Regulation," *Quarterly Journal of Economics* 120 (2005): 1445–73.

Conclusion

Using novel measures of regulation in the United States, Canada, Australia, and their respective states and provinces, we show that larger polities consistently have more regulation. This provides support for previous theoretical work that posited a fixed cost associated with regulating. Specifically, the fixed costs of establishing new bureaus, staffing them, and funding them to implement and enforce regulations may fall on a per capita basis with a larger population.

In addition to the fixed cost explanation, Mulligan and Shliefer offer other alternative explanations for why regulation may increase with population levels: First, regulation becomes

more desirable to settle disputes, compared to alternative methods, because mechanisms such as private ordering or judicial enforcement become more costly as population increases. Second, the scope of activities to regulate becomes larger as population increases, as does the scope of potential benefits of regulation.

In addition to these explanations, other plausible theories include the argument that with more people the prevalence of externalities or other market failures could increase, thereby necessitating more regulation. Larger populations might demand more regulations (because of increased market failures or perhaps because of cultural or political preferences associated with large populations). Alternatively, if regulation produces concentrated benefits and dispersed costs, a larger population could make it harder for those harmed by regulation to organize collectively to oppose it.

Future studies that make use of RegData and other similar datasets will help researchers pin down the relative importance of these mechanisms, but our work—together with that of Mulligan and Shleifer—shows that the empirical regularity is clear: higher population is associated with significantly more regulation.

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